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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/530,982

10/11/2005

Yoshiaki Arata

49288.1000

9255

20322 7590 10/03/2007  
SNELL & WILMER L.L.P. (Main)  
400 EAST VAN BUREN  
ONE ARIZONA CENTER  
PHOENIX, AZ 85004-2202

EXAMINER

DUDNIKOV, VADIM

ART UNIT

PAPER NUMBER

3663

MAIL DATE

DELIVERY MODE

10/03/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

Application No.

10/530,982

Applicant(s)

ARATA, YOSHIAKI

Examiner

Vadim Dudnikov

Art Unit

3663

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 20 July 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) 1-10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 July 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☒ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 4/11/05.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

A new examiner has assumed responsibility for the examination of the application.

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on July 20, 2007 has been entered.

### ***Response to Arguments***

1. Applicant's arguments on pages 9-12 filed 07/20/2007, with respect to of said previous Office have been fully considered but they are not in every respect persuasive. Claims 1-10 are pending. Applicants' amendments of specification and drawings are acknowledged, and it is noted that they do not serve to alter the scope of the invention. Applicants' amendments to claims 1, 3, 6 and 8 are acknowledged. Those objections or rejections that have been overcome by amendment are omitted from the present Office action and are considered withdrawn. Claims 1-10 have been examined.

Rejections of claims are established in light of further consideration and search of the prior Art. See rejections underneath.

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Applicant's arguments (printed *italic*) are considered and answered below.

Applicants arguments related to specification objection:

*Specifically, the Examiner asserts that "the phenomenon that elasticity emerges in the bond between atoms of the material" is central to the working of the invention, but inadequately described in the specification possibly due to the alleged improper incorporation by reference as described above. Applicant asserts that, by proper incorporation of the reference as set forth above, the specification properly describes the "phenomenon that elasticity emerges in the bond between atoms of the material". The Examiner next objects to the specification under 35 U.S.C. 112, first paragraph, because concepts and methods critical or essential to the practice of the invention are not enabled by the disclosure. The Examiner also rejects claims 1-10 under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. Applicant respectfully traverses this objection and rejection.*

*More specifically, the Examiner asserts that the specification does not adequately describe how to make or use the invention. The primary issue in contention includes how the deuterium atoms are brought within 0.6 Å or less of one another simply by being in a relationship with metal atoms, and how the  $2D + 2D = 4He + \text{lattice energy}$  (23.8 MeV) is favored over the other branching probabilities.*

*Applicant submits a copy of "Eur. Phys. J. A 27, s01, 187-192 (2006)", which discusses how d+d branching probabilities can be effected in metallic environments, and also result in the abatement of the Coulomb barrier. Applicant specifically asserts that the reference recites in the Introduction that:*

*There is multiple evidence that the physical environment where the nucleus is embedded can influence nuclear interactions, e.g. this is employed in nuclear condensed matter physics.*

*In order to. investigate the environmental impact on nuclear reactions, we experiment with the d+d reactions in metallic environments. We have already found a strongly enhanced electron screening effect leading to gross increase of the effective cross section by abatement of the Coulomb barrier due to the metal electrons which was later confirmed.*

*The Conclusion recites:*

*We presented a first experimental evidence for an alteration of the branching ratios in the d+d fusion reactions obtained in an accelerator experiment which can be theoretically explained by polarization of the reacting deuterons in the crystal lattice. So with the spin polarization is here another new way how the environment electron configuration can influence immediate nuclear processes. The dense bound and free electrons in the metal can abate the Coulomb barrier in a dynamic process prior to the reaction generating a gross enhancement of the cross section which can still not be described by theory to this extent.*

*Our findings also provide a first independent support for the claim in cold fusion that requires a heavily alteration of the d+d reaction channels in contradiction to the results obtained for gas targets.*

*As such, Applicant asserts that the publication therein shows that the branching*

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*probabilities of d+d nuclear reactions can be affected by interaction in a metallic environment and also that the Coulomb barrier can be reduced. Further, a theory is provided as to why this may occur.*

Answer: Scope of invention is a "method of heat generation" that means a generation of energy (heat) exceeding the energy consumed for said heat generation. Applicant must make credible that a proposed "method of heat generation" as disclosed can be used for net heat generation exceeding energy used for said heat generation (activation). In the recited publication "*Eur. Phys. J. A 27, s01, 187-192 (2006)*" and in some other some evidences are presented that probability of fusion reaction d d can be a little higher near threshold energy (this is equal to decrease of threshold energy of hundred eV) but does not change a main results: energy needed for fusion activation is many orders of magnitude higher than the energy produced from the said fusion.

These Applicant's arguments are not persuasive.

*The Examiner next rejects claims 1-10 under 35 U.S.C. 112, second paragraph, as indefinite for failing to particularly point out and distinctly claim the subject matter because they do not recite the input energy required for the invention to work. Applicant respectfully traverses this rejection.*

*To expedite prosecution, Applicant amends the independent claims to specify that the energy is --sufficient that at least two of the plurality of hydrogen isotope atoms solid-dissolved in the hydrogen condensate fuse--. Support for this amendment can be found, for example, on page 19, paragraph 2 and page 23, paragraph 3 of the Specification. Applicant asserts that the claims now sufficiently describe the level of energy necessary to initiate the reaction. It should be appreciated that the exact energy required would vary depending on the materials used. However, this parameter would be easily selected by one skilled in the art.*

Answer: Said questions are important, because Applicant must present a reliable proof that a proposed "method of heat generation" as disclosed can be used for net heat generation exceeding energy used for said heat generation (activation).

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For this it is need to know exactly the energy needed for fusion activation and energy produced from said fusion. In specification is not presented any reliable information related to activation energy. The energy is --sufficient that at least two of the plurality of hydrogen isotope atoms solid-dissolved in the hydrogen condensate fuse- determined by one really skilled in the art is much higher than energy produced in said fuse.

These Applicant's arguments are not persuasive.

*The Examiner next rejects claims 1, 3, 6, and 8 under 35 U.S.C. 112, second paragraph, as incomplete for omitting essential steps of "condensing the hydrogen isotope". Applicant respectfully traverses this rejection.*

*To expedite prosecution, Applicant amends the independent claims to specify the step of "condensing the hydrogen isotope." Support for this amendment can be found on page 21, lines 7-24 of the Specification. Briefly, the steps are:*

*(a) providing the nano-ultrafine particle in a container;  
(b) evacuating the container to high level of vacuum; and  
(c) introducing the hydrogen isotope atoms into the container so as to solid-dissolve the hydrogen isotope atoms in the nano-ultrafine particle so that the hydrogen condensate has a hydrogen isotope atoms/nano-ultrafine particle atom ratio of 250% or more.*

*The Examiner also asserts that the claims are unclear because the "internuclear spacing of a molecule consisting of (the) two hydrogen isotope atoms" has not been established. According to the Examiner's arguments, said spacing varies depending on conditions such as "temperature and the molecule's proximity to other molecules".*

*Given that such knowledge is well-known to the Examiner, Applicant asserts that one of ordinary skill in the art with common general knowledge would easily be able to assess such conditions and determine the internuclear spacing. However, for the sake of expediency, Applicant amends the independent claims to recite "internuclear spacing of a molecule consisting of the two hydrogen isotope atoms under the same conditions as the at least two of the plurality of hydrogen isotope atoms" (emphasis added).*

Answer: Applicant's assertion that "The space or room which is retained on a surface

layer or in the inside of the host as the capsule is preferably of the nanometer order

(e.g., the average diameter of the space regarded as the sphere is preferably about

0.002 to about 200 nm, or preferably about 0.005 to about 50 nm)" with localization of

atom inside diameter of 0.002 nanometer that is at 100 time smaller if hydrogen atom

diameter is moot. The nominal "internuclear spacing" in molecules  $H_2$ ,  $D_2$ ,  $T_2$ ,  $HD$ ,  $HT$ ,  $DT$  does not help to "fuse" said isotopes.

*The Examiner next rejects claims 1-10 under 35 U.S.C. 101 because the disclosed invention is inoperative and lacks utility. Applicant respectfully traverses this rejection. Applicant asserts that this rejection is largely based on the preceding rejections which have been appropriately addressed above: As such, Applicant asserts that the utility of the invention is well-known to those skilled in the art.*

*The Examiner next rejects claims 1-10 under 35 U.S.C. 112, first paragraph, as not supported by either a credible asserted utility or a well established utility. Applicant respectfully traverses this rejection. Applicant asserts that this rejection is largely based on the preceding rejections which have been appropriately addressed above. As such, Applicant asserts that the utility of the invention is well-known to those skilled in the art.*

Answer: Scope of invention is a "method of heat generation" that means a generation of energy (heat) exceeding the energy consumed for said heat generation. Applicant must make credible that a proposed "method of heat generation" as disclosed can be used for net heat generation exceeding energy used for said heat generation (activation). In the recited publication and in some other some evidences are presented that probability of fusion reaction  $d+d$  can be little higher near threshold energy (this is equal to decrease of threshold energy of hundred eV) but does not change a main results: energy needed for fusion activation is at many orders of magnitude higher than the energy produced from the said fusion. By this reason the Applicant's "method of heat generation" cannot be used for net heat generation as disclosed and claimed. For practical heat generation it should be much efficient and must be easy detectable. By this reason the disclosed invention is inoperative and lacks utility. The steps of "method of heat generation" as claimed were reproduced in many works, but was not detected

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any anomaly in "heat generation", that for enablement of disclosed invention must be very significant

These Applicant's arguments are not persuasive.

*The Examiner next rejects claims 1-10 under U.S.C. 103(a) as being obvious over Zaluska et al. (Appl. Phys. 2000) and admissions by the Applicant. Applicant respectfully traverses this rejection.*

*Applicant asserts that, based on the above arguments and amendments, the presently claimed invention cannot be made obvious by Zaluska, as Zaluska does not describe a viable method for producing energy by the fusion of two hydrogen isotope atoms. Applicant respectfully submits that the pending claims are in condition for allowance. Reconsideration of the application is thus requested.*

Answer: In Zaluska paper as in many other publications are reproduced the same procedures that disclosed in application as the steps of "method of heat generation", but was not detected any anomaly in "heat generation", that for enablement of disclosed invention must be very significant.

Rejections of claims are established in light of further consideration and search of the prior Art. See rejections underneath.

### ***Information Disclosure Statement***

2. The information disclosure statements filed 04/11/2005 and all other information or that portion which caused it to be listed has been placed in the application file. The information has been considered.

### ***Specification***



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3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. The specification is objected to under 35 U.S.C. 112, first paragraph as failing to provide an adequate written description of the invention and as failing to adequately teach how to make and/or use the invention, i.e. failing to provide an enabling disclosure. There are many factors recognized by the MPEP that are to be considered when determining whether there is insufficient evidence to support a determination that a disclosure satisfies the enablement requirement, including the nature of the invention, the level of predictability in the art and the existence of working examples. See MPEP 2164.01 (a). The examiner has the initial burden of challenging an asserted utility. Once the examiner has provided evidence showing that one of ordinary skill in the art would reasonably doubt the asserted utility of the invention, the burden shifts to the applicant to provide rebuttal evidence. See MPEP 2164.07(B).

It is considered by the examiner that the invention of the present application is lacking in utility because disclosed in [0001] “**methods of generating heat using the hydrogen condensate**” (i. e. with release of the net nuclear fusion energy above a spend one for activation) that are not proven and/or are contrary to a **modern nuclear physics and solid state physics**, to the current understanding of physics and because, even if it

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were possible to practice the invention, the applicant has not described the method used to implement it in sufficient detail to enable a skilled artisan to make and use it without undue experimentation.

It is possible to generate the net fusion energy, by metal hydride (deuteride) **activation with a very high power** density, such as thermal, electromagnetic, or the kinetic energy of particles. Also it is possible to activate the fusion by exposing such matter to the energetic particles produced according to the disclosed method, but energy, necessary for activation of hydrogen isotopes fusion is much higher than released from said nuclear fusion. Hydrogen isotope localization by metal lattice (and electron shielding) is similar to hydrogen isotopes localization in other molecules and cannot increase probability of nuclear fusion significantly as demonstrated in recent experiments (F. Raiola et al, "Electron shielding in  $d(d,p)t$  for deuterided metals and the periodic table", Physics Letters B, V. 547 (3-4), pp.193-199, 2002). Parameters of said "activation" are disclosed in many books related to nuclear Fusion for example in Knief, Nuclear engineering", Hemisphere Publishing Corporation, 1992, pp. 636,642. For net energy production in D-T reaction it is need to heat D-T compound up to 10 keV equal to hundred million degree Celsius and product of density to confinement time should be larger than Lawson criterion (page 641, lines 11+). The electron shielding decreases a threshold energy for dd fusion very little and does not permit net energy production with a low activation energy as necessary for enablement of disclosed invention.

Until now net energy production from solid hydrides were activated only by a nuclear explosion in a "hydrogen" fusion explosion.

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Applicant's statement of asserted utility that "The present invention is provided to solve the above-described problems. An object of the present invention is to provide: (1) a hydrogen condensate in which a larger quantity of hydrogen isotope atoms are solid-dissolved among metal atoms than in conventional techniques; and (2) a method of generating heat using the hydrogen condensate".

The "Hydrogen condensate", disclosed in application cannot enhance an energy efficiency of nuclear fusion with low energy activation significantly up to possibility release of net nuclear energy (as discussed above).

The nature of the invention rests on certain basic concepts, including the following:

[0013] Another method of the present invention is a method of generating heat using a hydrogen condensate. The hydrogen condensate comprises a metal alloy composite containing a plurality of metal atoms and a plurality of hydrogen isotope atoms solid-dissolved among the plurality of metal atoms, and at least two of the plurality of hydrogen isotope atoms are condensed so that an inter-atomic nuclear distance between the two hydrogen isotope atoms is smaller than or equal to an internuclear spacing of a molecule consisting of the two hydrogen isotope atoms. The heat generation method comprises applying energy to the hydrogen condensate, and generating heat by causing the at least two hydrogen isotope atoms to react with each other due to the energy. Thereby, the above-described object is achieved.

[0014] The energy may be generated based on at least one of ultrasonic wave, strong magnetic field, high pressure, laser, laser explosive flux-compression, high-density electron beam, high-density current, discharge, and chemical reaction.

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[0015] In the step of generating heat, the at least two hydrogen isotope atoms are reacted with each other to generate a helium molecule in addition to the heat.

1). Accordingly, there is disclosed a method of generating net heat, which comprises contacting metal nanostructures with hydrogen isotopes and applying activation energy to the nanoparticles. In one embodiment, the hydrogen isotopes comprises hydrogen, deuterium, tritium, and combinations thereof .

[0058] The space or room which is retained on a surface layer or in the inside of the host as the capsule is preferably of the nanometer order (e.g., the average diameter of the space regarded as the sphere is preferably about 0.002 to about 200 nm, or preferably about 0.005 to about 50 nm). The number of captured hydrogen isotopes/hydrogen condensate needs to be at least two.

[0089] By applying energy to the ultrahigh-density deuterated nanoparticle, a plurality of deuterium atoms react with one another to generate heat and helium molecules.

The reaction is represented by:

[0090]  $2D + 2D = 4He + \text{lattice energy (23.8 MeV)}$ .

[0091] The reaction does not generate a neutron and is a mild nuclear fusion reaction, and therefore, is desirably better than a DD nuclear fusion reaction described below.

Therefore, the ultrahigh-density deuterated nanoparticle of the present invention is recommended to be used for a nuclear fusion reaction in terms of the conservation of the environment. The well-known DD nuclear fusion reaction which causes a radical impact of deuterium atoms to generate T and neutrons is extremely dangerous, and

therefore, is not desirable in terms of industrial applicability and conservation of the environment.

[0092] The reaction of deuterium generates high-temperature and high-pressure gas and helium gas in the reaction furnace 201. The high-temperature and high- pressure gas and the helium gas are removed via the gas outlet 205.

The applicant claims that the heat generation and increased concentration of helium 4 was detected after hydride activation by ultrasound waves (Fig. 4, and [0095]-[0098]).

There is no credible record to indicate that the “The inside of the reaction furnace 201 is considered to have high temperature and high pressure, indicating a **tremendous nuclear fusion reaction**”.

It is possible to hope that discloses embodiments are based on either rigorous, credible experimental evidence of heat generation. But there are no evidences of activation of fusion reaction, directly contradicts accepted science. In such types of experiments, involving high reactive hydrides with a non equilibrium lattice and hydrogen release it is possible to have different chemical reactions and lattices relaxation with heat generation. There are no credible information related to realization of “the above-described finding, we determined that the resultant nuclear fusion reaction is  $2D + 2D = 4He + \text{lattice energy (23.8 MeV)}$ ” [00102].

Also, in the presence of deuterium, as in disclosed embodiments, it is possible to have a limited number of neutrons produced through generation of high voltage by high

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frequency-pulse transformation or by electrostatic induction and high voltage break down with acceleration of some deuterons above threshold energy for neutron generation.

But, a few neutron generation is not enough for net energy production. For net energy production by d- d reaction it is necessary to generate at least  $\sim 10^{12}$  neutrons per second for every Watt of generated (or spend) power. Activation of hydrides with hydrogen isotopes by ion beams and by discharge is a standard method of a nuclear fusion providing for neutron generation in a high quantity, but the fusion energy produced in this process is far below of energy used for said activation. There are no credible evidences that in Applicant's disclosed "method of heat generation" the net heat generation is possible.

The specification does not disclose a credible source of produced energy.

Below is presented a conclusions of DOE 2004 Report of the Review of Low Energy

#### Nuclear Reactions:

Reviewers expert in nuclear physics noted that the cold fusion mechanism put forward by proponents is not in accord with presently accepted knowledge of D + D fusion. Specifically, D + D fusion is accompanied by the production of protons, neutrons, tritons,  $^3\text{He}$ ,  $^4\text{He}$  and high energy gamma rays, all in well known proportions. The fusion channel resulting in  $^4\text{He}$  and high energy gamma rays occurs approximately only once for every  $10^7$  D + D fusion reactions. These characteristic proportions for the production of the fusion products are found for every energy of the incident deuteron measured so far, down to the lowest that has been measured. The review document and oral presentations made the argument that the branching ratios are different at low energies and that in cold fusion,  $^4\text{He}$  fusion channel is predominant. According to the review document, no high energy gamma rays appear to accompany the  $^4\text{He}$ , as is observed in D-D fusion reactions. Instead, the approximately 24 MeV in energy resulting from D-D fusion was purported to appear as heat in the material lattice. To explain these unusual characteristics, the reviewers were presented with a theoretical framework that purported to describe how collective energy from the material lattice couples to a deuteron pair to induce fusion, how the only fusion reaction channel that occurs would

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be the production of  $4\text{He}$ , and how all the energy is coupled back into the material in the form of heat instead of high energy gamma-rays. The reviewers raised serious concerns regarding the assumptions postulated in the proposed theoretical model for the explanation for  $4\text{He}$  production. The preponderance of the reviewers' evaluations indicated that Charge Element 2, the occurrence of low energy nuclear reactions, is not conclusively demonstrated by the evidence presented. One reviewer believed that the occurrence was demonstrated, and several reviewers did not address the question (page 4, lines 19+).

While significant progress has been made in the sophistication of calorimeters since the review of this subject in 1989, the conclusions reached by the reviewers today are similar to those found in the 1989 review (Page 5, lines 15+).

It is no any credible evidence for possibility of net energy generation by low energy activated fusion reaction with any catalyst.

As stated in MPEP § 2164.03, the amount of guidance or direction needed to enable the invention is inversely related to the amount of knowledge in the state of the art as well as the predictability in the art. The art of the present invention (method of heat generation in hydrogen condensate by nuclear fusion reaction is  $2\text{D} + 2\text{D} = 4\text{He} +$  lattice energy (23.8 MeV) is so new that it cannot be considered to have a body of knowledge associated with it, much less predictability of results). Applicant has only provided data that is based upon questionable science, and so that data is also questionable until such time that applicant rigorously proves that the applied concepts were plausible and the data statistically sound. Since Applicant has not established the operability of the presently claimed invention as discussed, it is considered that the invention is lacking in utility. Given the state of the art as discussed herein, it would be unreasonable to expect one skilled in the art to be able to make and use the claimed invention without undue experimentation

It is well established that where, as here, the utility of the claimed invention is based upon allegations that border on the incredible or allegations that would not be readily

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accepted by a substantial portion of the scientific community, sufficient substantiating evidence of operability must be submitted by applicant.

Simply stating that the concepts the inventor espouses are correct is not sufficient substantiating evidence. Sufficient substantiating evidence may be based on widely accepted scientific concepts (e.g., quantum nuclear physics, credible experiment), a working model, or a supporting opinion in a widely respected and peer-reviewed publication (existing credible publications do not support optimistic Applicant's assumptions).

It is thus considered that the examiner has set forth a reasonable and sufficient basis for challenging the adequacy of the disclosure. The statute requires the applicant itself to inform, not to direct others to find out for themselves. MPEP 2107.01. Note that the disclosure must enable a person skilled in the art to practice the invention without having to design structure not shown to be readily available in the art; *In re Hirsch*, 131 U.S.P.Q. 198.

Given the state of the art as discussed herein, it is unreasonable to expect one skilled in the art to be able to make and use the claimed invention without undue experimentation.

The claimed invention as a whole must be **useful** and accomplish a **practical** application. That is, it must produce a "useful, concrete and tangible result". MPEP 2106, Section II. The purpose of this requirement to limit patent protection to inventions that possess a certain level of "real world" value, as **opposed to subject matter that**



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**represents nothing more than an idea or concept, or is simply a starting point for future investigation or research. MPEP 2106, Section II.**

**MPEP 2164.01(a) Undue Experimentation Factors**

There are many factors to be considered when determining whether there is sufficient evidence to support a determination that a disclosure does not satisfy the enablement requirement and whether any necessary experimentation is "undue." These factors include, but are not limited to:

(A) The breadth of the claims- *is broad and doubtful, because the invention alleges to solve a "fusion energy generation and helium production" by process contradicted to modern science.*

(B) The nature of the invention- *there is a method of heat generation through nuclear fusion with low threshold activation energy "; the nature of the invention as disclosed thus involves very drastic change of hypotheses in the nuclear physics;*

(C) The state of the prior art- *effects claimed by applicant's were not observed in many experiments with much, much higher scale of energy activation. There are no evidences, that a claimed process can be used for net fusion energy production (Hydrogen isotopes localization produced in hydrides is hundred thousand times larger than hydrogen isotope size and cannot enhance significantly a nuclear transmutation probability);*

(D) The level of one of ordinary skill- *there is no experience for strong enough nuclear fusion enhancement by nanohydrides (hydrogen condensate) with hydrogen isotopes;*

(E) The level of predictability in the art- *a possibility for nuclear fusion with low activation energy, and net energy generation by said fusion with a hydrogen isotopes as claimed are likely impossible.*

(F) The amount of direction provided by the inventor- *is wholly insufficient because, inventor presented assumptions, speculations related to nuclear fusion and heat and helium generation are not conformed in independent experiments.*

(G) The existence of working examples- **example exist** *but realization of heat and helium detection during activation of "hydrogen condensate"*

*contacting with hydrogen isotopes (D2) is not credible and does not have independent confirmations.*

**(H) The quantity of experimentation needed to make or use the invention based on the content of the disclosure- *need undue experimentation and can have likely negative results.***

***Claim Rejections - 35 USC § 112***

5. Claims 1-10 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. Concepts and methods critical or essential to the practice of the invention, but not included in the claims are not enabled by the disclosure as set forth in section 3 of this Office action. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is clear that a certain amount of energy is at least required for practicing the method, yet the claims are inclusive of the application of any conceivable level of energy. The claims therefore fail to particularly point and specifically claim the subject matter of the invention. The reason for this is set forth in section 3 of this Office Action.

***Claim Rejections - 35 USC § 101***

8. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

9. Claims 1-10 are rejected under 35 U.S.C. 101 because the disclosed invention is inoperative and therefore lacks utility, as set forth in section 3 of this Office Action.

10. Claims 1-10 are also rejected under 35 U.S.C. 112, first paragraph. Specifically, since the claimed invention is not supported by either a credible asserted utility or a well established utility for the reasons set forth above in section 3, one skilled in the art clearly would not know how to use the claimed invention.

***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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12. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chambers et al. (Upper limit on cold fusion in thin palladium film" Physical Review B, 41 (8), 5388-5391, 1990) in view of Krane (Introductory nuclear physics", John Wiley & Sons, 1998)

The method as claimed is unpatentable over prior arts, but the utility as asserted in the specification of applicant is not enabled in the reference either.

Regarding claim 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 Chambers discloses: a method of generating heat (fusion reaction registration; abstract, page 5388 column 1, lines 1+) using a hydrogen condensate (hydrogen isotopes introduced into the **palladium** metal lattice (as claimed in claims 2 and 7), page 5388, column 1, lines 27+), wherein the hydrogen condensate comprises a metal nano-ultrafine particle containing a plurality of metal atoms and a plurality of hydrogen isotope atoms solid-dissolved among the plurality of metal atoms (nanoparticles of metal and hydrates are formed during metal vapor deposition and during ion sputtering, deposition, implantation; electron beam thermal evaporation), and at least two of the plurality of hydrogen isotope atoms are condensed so that an inter-atomic nuclear distance between the two hydrogen isotope atoms is smaller than or equal to an internuclear spacing of a molecule consisting of the two hydrogen isotope atoms under the same conditions as the at least two of the plurality of hydrogen isotope atoms (a distance between hydrogen atoms in saturated hydrides is comparable with hydrogen distance in molecules), the heat generation method comprising: (i) condensing the hydrogen condensate by  
(a) providing the nano-ultrafine particle in a container (by thermal evaporation and

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sputtering); (b) evacuating the container to high level of vacuum(up to  $5 \times 10^{-7}$  Torr); (c) introducing the hydrogen isotope atoms into the container so as to solid-dissolve the hydrogen isotope atoms in the nano-ultrafine particle so that the hydrogen condensate has a hydrogen isotope atoms/nano-ultrafine particle atom ratio of 250% or more (introducing and implantation of hydrogen isotopes; page 5388, column 2, lines 1+, creating high [D]/[Pd] ratios  $>1.3$ ); (ii) applying energy to the hydrogen condensate sufficient that at least two of the plurality of hydrogen isotope atoms solid-dissolved in the hydrogen condensate fuse (bombarding by accelerated deuterium ions; Abstract; page 5389, column 1, lines 15+).

Chambers does not necessarily teach directly the limitation: generating heat by causing the at least two isotope atoms to fuse with each other due to the energy (limitation of claims **1, 3, 5 and 10**). Fusion was not registered with said energy deuterium ion 1.5 keV.

However, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include said limitation in view of Krane, drawn to rate of nuclear fusion and fusion reaction activation who teaches that a threshold energy for DD fusion reaction is above 14 keV and the threshold of DT reaction is above 7 keV (page 532, Figure 14.1). The heat from fusion reaction can be generated by increase the energy of bombarding ions above said threshold. Other method of heat generation with nuclear fusion activation is disclosed in page 553 (14.5 thermonuclear fusion). For said activation used discharge end explosive compression as claimed in claims **4 and 9**. This teaching is anticipated limitations of claims **1, 3, 4, 5, 9 and 10**.

Motivation for said inclusion derives from Chambers: "It is possible, however, that condition for production fusion have not been met in our experiments" (page 5391, column 2, lines 2+).

The claim would have been obvious because a person of ordinary skill has good reason to pursue the known options within his her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense.

### ***Conclusion***

13. The following references are cited for explanation of an inoperativeness of the applicant's claimed and disclosed invention:

F. Raiola et al, "Electron shielding in d(d,p)t for deuterided metals and the periodic table", Physics Letters B, V. 547 (3-4), pp.193-199, (2002).

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vadim Dudnikov whose telephone number is 571- 270-1325. The examiner can normally be reached on 8:00 - 17:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack W. Keith can be reached, Mon-Fri 7:00am-4:00 pm, at telephone number 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the


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Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Patent Examiner.

Vadim Dudnikov

September 25, 2007.

Primary Patent Examiner:  
 (9/28/07)  
Johannes Mondt  
(TC 3600,